ELEC-204 HW-2

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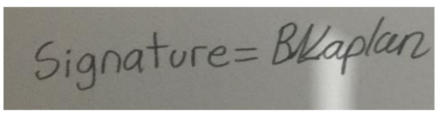

SOLUTIONS

1-) 117= 14*8+5 (When we divide 117 by 8, the remainder is 5.)
14= 1*8+6 (When we divide 14 by 8, the remainder is 6.)
1= 0*8+1 (When we divide 1 by 8, the remainder is 1.)

When we convert the value of 117 in base 10 to its corresponding value in base 8, we will get the value of 165 in base 8.

Take the parts except the fractional parts for the results below.

(0.23)*8= 1.84 (Take 1)
(0.84)*8= 6.72 (Take 6)
(0.72)*8= 5.76 (Take 5)
(0.76)*8= 6.08 (Take 6)

So, the value of 0.23 in base 10 is equal to the value of 0.1656 in base 8.

Finally, when we convert the value of 117.23 in base 10 to octal, we get the value of 165.1656 in base 8. So, the answer for question-1 is 165.1656 in base 8.

2-) 135= 128+4+2+1= (2^7)+(2^2)+(2^1)+(2^0)
So, the binary value of the value of 135 in base 10 is 10000111.

135= 16*8+7 (When we divide 135 by 8, the remainder is 7.)
16= 2*8+0 (When we divide 16 by 8, the remainder is 0.)
2= 0*8+2 (When we divide 2 by 8, the remainder is 2.)

So, the value of 135 in base 10 is equal to the value of 207 in base 8.

The octal representation of the value of 135 in base 10= The value of 207 in base 8.

The binary representation of the value of 135 in base 10= 10000111.

3-) (r-1)'s Complement

If the number is given as N, the base is given as r, the number of digits is given as n, then the (r-1)'s complement of N can be represented as ((r^n)-1)-N.
N= 135
n=3(There are three digits in the number '135')
r=10 (The base is 10)

9's complement of the value of 135 in base 10= ((10^3)-1)-135 = 999-135 = 864

10's complement of the value of 135 in base 10= 864+1= 865(Since the formula for r's complement is (r^n)-N, the value for r's complement will be found by adding 1 to the result of the (r-1)'s complement.)

4-) 19= 16+2+1= 2^4+2^1+2^0, 19 can be represented in the binary form of 00010011. -19 as 8-bit numbers in sign-magnitude representation can be written as 10010011.

Sign-magnitude representation of -19: 10010011

For finding the two's complement of -19, we should first write down the binary form of 19.

19= 00010011

Then, we should invert the digits.

00010011 → 11101100

Finally, we should add 1 to this resulting binary number.

11101100+1= 11101101

Two's complement of -19: 11101101

We can find the one's complement of -19 by subtracting 1 from the binary number we found for the two's complement.

11101101-1= 11101100

One's complement of -19: 11101100

5-) 00110011= 1*(2^0)+1*(2^1)+1*(2^4)+1*(2^5)=1+2+16+32=51
01100011= 1*(2^0)+1*(2^1)+1*(2^5)+1*(2^6)=1+2+32+64=99
10111111= -(2^7)+1*(2^5)+1*(2^4)+1*(2^3)+1*(2^2)+1*(2^1)+1*(2^0)
10111111= -128+32+16+8+4+2+1= -96+24+4+3= -96+28+3=-96+31=-65
99+51+(-65)= 150-65=85
85=64+16+4+1= 1*(2^6)+1*(2^4)+1*(2^2)+1*(2^0)
85= 01010101
The result of the addition in the binary form= 01010101

6-) (4C) in base 16:

C= 12, (12*(16^0))= 12*1= 12
4*(16^1)=4*16=64
64+12=76

(3A) in base 16:

A= 10, (10*(16^0))=10*1=10
3*(16^1)=3*16=48
48+10=58

When we add (4C) in base 16 and (3A) in base 16, we will get 134 from the addition of 76 and 58 as the decimal representation.

134= 8*(16^1)+6*(16^0). So, the hexadecimal equivalent of 134 is 86.

The answer (addition of (4C) in base 16 and (3A) in base 16) represented in hexadecimal form is 86. In other words, the answer is 86 in base 16.